

REMARKS

This application has been carefully reviewed in light of the Office Action dated June 10, 2009. Claims 13, 15 to 22 and 25 to 27 are now pending in the application, with Claims 25 to 27 having been newly added and Claims 23 and 24 having been cancelled herein. Claims 13, 17, 19 and 20 are in independent form. Reconsideration and further examination are respectfully requested.

Applicants wish to thank the Examiner for the indication that Claims 13 and 15 to 18 contain allowable subject matter, and for the courtesies extended to Applicants' representative during the telephone interview conducted on October 2, 2009. This Amendment has been prepared based on the discussions during that interview and it is respectfully submitted that the following summarizes the content of the interview.

In the Office Action, the drawings were objected to because they allegedly fail to show the feeding unit as described in the specification. The objection is believed to be obviated by the cancellation of Claim 23, and reconsideration and withdrawal of the objection are respectfully requested.

The specification was objected to because element 33 is not described in the specification. The objection is believed to be obviated by the foregoing amendment to the specification, and reconsideration and withdrawal of the objection are respectfully requested.

Claims 19, 20 and 22 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,384,715 (Lytton). Claim 21 was rejected under 35 U.S.C. § 103(a) over Lytton and U.S. Patent No. 5,936,237 (Van Der Weide). Claims 23 and 24 were rejected under 35 U.S.C. § 103(a) over Lytton, Admitted Prior Art and U.S. Patent No. 5,086,279

(Wochnowski). Reconsideration and withdrawal of these rejections are respectfully requested.

Claims 13 and 17

Referring specifically to claim language, amended independent Claim 13 is directed to a system for counting the number of layers of a multilayer object. The system includes an oscillation unit for oscillating an electromagnetic wave having a frequency in a range from 30 GHz to 100 THz to irradiate either a top surface or a bottom surface of the multilayer object. The system further includes a first reception unit for receiving the electromagnetic wave having pulses reflected at interfaces of the layers of the multilayer object, and a first processing unit for counting the number of pulses of the electromagnetic wave received by the first reception unit, and counting the number of layers of the multilayer object on the basis of the counted number of pulses. The system also includes a second reception unit for receiving the electromagnetic wave oscillated by the oscillation unit and transmitted through the multilayer object, and a second processing unit for counting the number of layers of the multilayer object on the basis of a delay time detected by using the transmitted electromagnetic wave. The number of layers counted by the first processing unit is compared with the number of layers counted by the second processing unit to count the number of layers of the multilayer object.

Amended independent Claim 17 is directed to a method substantially corresponding to the system of Claim 13.

The applied art, alone or in any permissible combination, is not seen to disclose or suggest all of the features of Claim 13 and 17, and in particular, is not seen to disclose or suggest at least the features of a first processing unit/step for counting a number

of pulses of an electromagnetic wave received by a first reception unit/step, and counting a number of layers of a multilayer object on a basis of the counted number of pulses, and a second processing unit/step for counting the number of layers of the multilayer object on the basis of a delay time detected by using the transmitted electromagnetic wave, wherein the number of layers counted by the first processing unit/step is compared with the number of layers counted by the second processing unit/step to count the number of layers of the multilayer object.

In this regard, Lytton is seen to disclose a system used to obtain digitized images of a reflected radar signal from a multilayer signal. Standard mathematical techniques are then applied to these images to determine a number layers, a thickness of each layer, and a dielectric constant for each layer within the multilayer system. (See Abstract of Lytton). For example, the number of peaks in a reflected signal indicates the number of layers comprising a pavement system, the ratio of reflected signal peaks provides information regarding the dielectric constant of the different layers within the pavement system, and the time between peak values can be used to determine the thicknesses of the different layers within the pavement system. However, Lytton is not seen to disclose or suggest a first processing unit/step for counting a number of pulses of an electromagnetic wave received by a first reception unit/step, and counting a number of layers of a multilayer object on a basis of the counted number of pulses, and a second processing unit/step for counting the number of layers of the multilayer object on the basis of a delay time detected by using the transmitted electromagnetic wave, wherein the number of layers counted by the first processing unit/step is compared with the number of

layers counted by the second processing unit/step to count the number of layers of the multilayer object.

The remaining applied references, namely Van Der Weide and Wochnowski, are not seen to remedy the above-described deficiencies of Lytton. In this regard, Van Der Weide is seen to disclose a combined near-zone electromagnetic field and topography probe based on a scanning-probe microscope (SPM). Wochnowski is seen to disclose exposing a commodity to electrical energy having at least one characteristic which is influenced by moisture, monitoring the energy which has penetrated the commodity, and generating first signals denoting the at least one (influenced) characteristic of monitored electrical energy. However, neither Van Der Weide nor Wochnowski is seen to add anything that, when combined with Lytton, assuming such could be combined, would have resulted in at least the features of a first processing unit/step for counting a number of pulses of an electromagnetic wave received by a first reception unit/step, and counting a number of layers of a multilayer object on a basis of the counted number of pulses, and a second processing unit/step for counting the number of layers of the multilayer object on the basis of a delay time detected by using the transmitted electromagnetic wave, wherein the number of layers counted by the first processing unit/step is compared with the number of layers counted by the second processing unit/step to count the number of layers of the multilayer object.

Accordingly, Claims 13 and 17 are believed to be in condition for allowance, and such action is respectfully requested.

Claims 19 and 20

Referring specifically to claim language, amended independent Claim 19 is directed to a system for counting the number of layers of a multilayer object. The system includes an oscillation unit for oscillating an electromagnetic wave having a frequency in a range from 30 GHz to 100 THz to irradiate either a top surface or a bottom surface of the multilayer object. The system further includes a reception unit for receiving the electromagnetic wave having pulses reflected at interfaces of the layers of the multilayer object. The system also includes a processing unit for counting the number of layers of the multilayer object on the basis of the number of pulses, which is counted by using output values of the reflected electromagnetic wave by sampling output values of the reflected electromagnetic wave pulses at every split time, the split time being shorter than a pulse width of a temporal waveform of the reflected electromagnetic wave. The sampling is performed for a predetermined amount of time.

Amended independent Claim 20 is directed to a method substantially corresponding to the system of Claim 19.

The applied art, alone or in any permissible combination, is not seen to disclose or suggest all of the features of Claims 19 and 20, and in particular, is not seen to disclose or suggest at least the features of, sampling is performed for a predetermined period of time.

In this regard, Lytton is seen to disclose that a sample rate of a ground penetrating radar (GPR) system's receiver or signal processor needs to be sufficiently high that a high resolution representation of the signal is made. This requirement is driven by the well-known sampling theory of Nyquist. (See column 9, lines 40 to 46 of Lytton).

However, Lytton is not seen to disclose or suggest that sampling is performed for a predetermined period of time.

The remaining applied references, namely Van Der Weide and Wochnowski, are not seen to remedy the above-described deficiencies of Lytton. In this regard, as discussed above, Van Der Weide is seen to disclose a combined near-zone electromagnetic field and topography probe based on a scanning-probe microscope (SPM). Wochnowski is seen to disclose exposing a commodity to electrical energy having at least one characteristic which is influenced by moisture, monitoring the energy which has penetrated the commodity, and generating first signals denoting the at least one (influenced) characteristic of monitored electrical energy. However, neither Van Der Weide nor Wochnowski is seen to add anything that, when combined with Lytton, assuming such could be combined, would have resulted in at least the features of, sampling is performed for a predetermined period of time.

Accordingly, Claims 19 and 20 are believed to be in condition for allowance, and such action is respectfully requested.

Additionally, Applicants respectfully disagree with the Office Action's assertion that "it would have been obvious to modify Lytton to include frequencies in the desired range for the purpose of penetrating and characterizing different desired materials". Specifically, the proposed modification to Lytton would render the reference unsatisfactory for its intended purpose and therefore, there simply is not such motivation to modify the reference.

MPEP § 2142 requires that the "examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness." "Obviousness can be

established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006).” MPEP § 2143.01.

However, “[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” In the present case, Applicants submit that the proposed modification would render Lytton unsatisfactory for its intended purpose.

In this regard, the intended purpose for Lytton is to analyze layers of pavement. If Lytton were modified to use an electromagnetic wave having a frequency in a range from 30 GHz to 100 THz, Lytton would not be able to distinguish between the layers of pavement and thus, Lytton would not be able to analyze the layers of pavement. (See, e.g., “High-resolution Time-of-flight Terahertz Tomography Using A Femtosecond Fiber Laser”, by Jun Takayanagi, et al., cited in the Information Disclosure Statement being submitted concurrently herewith; see also, e.g., Exhibit A in the attached Appendix which is an experiment of the Takayanagi article (showing an output image on the left, and showing the real part of input on the right)). Thus, there is simply no motivation to modify Lytton to use an electromagnetic wave having a frequency in a range from 30 GHz to 100 THz. Accordingly, the Office Action has simply failed to set forth a *prima facie* case of obviousness and the rejections should be withdrawn.

The other claims in the application are each dependent from the independent claims discussed above and are believed to be allowable over the applied art for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of

the invention, however, the individual consideration of each on its own merits is respectfully requested.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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## **APPENDIX**

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